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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/693,906

10/28/2003

Yosuke Mizuyama

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WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER

TRINH, SONNY

ART UNIT

PAPER NUMBER

2687

DATE MAILED: 02/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/693,906

Applicant(s)

MIZUYAMA ET AL.

Examiner

Sonny TRINH

Art Unit

2687

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-18 and 26-31 is/are allowed.
- 6) ☒ Claim(s) 19-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. **Figure 4** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 22, 19-21** are rejected under 35 U.S.C. 102(b) as being anticipated by Okumura et al. (hereinafter "Okumura"; U.S. Patent Number 5,786,655.

Regarding **claim 22**, with reference to figure 9, Okumura discloses a switching apparatus using a piezoelectric element, characterized in that: plural electrode pairs for

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applying electric fields to said piezoelectric element are included; and the electric fields in the plural electrode pairs are applied to said piezoelectric element so that the directions of the electric fields are nearly opposite to each other between the adjacent electrode pairs (column 4 line 59 to column 5 line 62).

Regarding **claim 19**, this claim merely reflect the method claim as opposed to the apparatus claim of claim 22 and is therefore rejected for the same reasons.

between said second electrode pair.

Regarding **claims 20-21**, Okumura further teaches that the potential difference produced between said first electrode pair is nearly equal to the potential difference produced between said second electrode pair and obviously from a common power source (figures 1-2, column 3 line 23 to column 4 line 19).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 23-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Uchiyama et al. (hereinafter "Uchiyama"; U.S. Patent Number 6,912,760 B2).

Regarding claims 23-25, Okumura discloses the invention but does not disclose that the piezoelectric element is formed by a thin film process, or the piezoelectric element is formed on an MgO substrate nor a silicon substrate.

In an analogous art, Uchiyama discloses the method of manufacturing a thin film piezoelectric element (abstract). Uchiyama further teaches that the piezoelectric element can be formed by a thin film process, or formed on an MgO substrate or a silicon substrate (column 15 line 60 to column 16 line 15).

Therefore, it would have been to one of ordinary skill in the art, at the time the invention was made to employ the process of forming the piezoelectric element, as taught by Uchiyama and apply it to the piezoelectric element of Okamura. The motivation for doing so would be to improve the productivity and provide the products at low costs (column 2 lines 53-63 of Uchiyama).

Allowable Subject Matter

4. Claims 1-18, 26-31 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding **claim 1**, the applied references fail to disclose or render obvious the claimed limitations, specifically wherein the switching apparatus comprising: a substrate; a movable portion which has both ends fixed on said substrate and is operated in relation to said substrate; a switching electrode which is electrically insulated from said movable portion and provided on said movable portion; and a gap

electrode which is provided opposed to said switching electrode, and electrically conducts when said switching electrode comes into contact with the gap electrode with the operation of said movable portion, wherein said movable portion comprises: a piezoelectric element; a first electrode provided on the substrate side of said piezoelectric element; a third electrode which is provided on the substrate side of said piezoelectric element and is electrically insulated from said first electrode; a second electrode provided on the opposite side to the substrate side of said piezoelectric element so as to be opposed to said first electrode; a fourth electrode which is provided on the opposite side to the substrate side of said piezoelectric element so as to be opposed to said third electrode and which is electrically insulated from said second electrode; and a voltage applying unit is provided, which applies voltages to at least any one of said first electrode and said second electrode, and at least any one of said third electrode and said fourth electrode.

Claims 2-8 are allowed by virtue of their dependency on claim 1.

Regarding **claim 9**, the applied references fail to disclose or render obvious the claimed limitations, specifically wherein the switching apparatus comprising: a substrate; a movable portion which has both ends fixed on said substrate and can operate in relation to said substrate; a switching electrode which is electrically insulated from said movable portion and provided on said movable portion; and a gap electrode which is provided opposed to said switching electrode and electrically conducts when said switching electrode comes into contact with the gap electrode with the operation of said movable portion, wherein said movable portion comprises: a piezoelectric element;

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first, third and fifth electrodes which are provided on the substrate side of said piezoelectric element and electrically insulated from one another; second, fourth and sixth electrodes which are respectively opposed to said first, third and fifth electrodes with the substrate between on the opposite side to the substrate side of said piezoelectric element, and electrically insulated from one another; and a voltage applying unit is provided, which applies voltages to at least either said first electrode or said second electrode, at least either said third electrode or said fourth electrode, and either any one of said fifth electrode or said sixth electrode.

Claims 10-18 are allowed by virtue of their dependency on claim 9.

Regarding **claim 26**, the applied references fail to disclose or render obvious the claimed limitations, specifically wherein the switching system using a piezoelectric element, comprising: a piezoelectric element; plural electrode pairs for applying electric fields to this piezoelectric element; an electric wiring for supplying electric power to these electrode pairs, an electrode pair for electrically connecting an antenna and a high-frequency circuit for transmission and reception; and a coupler for matching said piezoelectric element to said high-frequency circuit, wherein the electric fields in the plural electrode pairs are applied to said piezoelectric element so that the directions of the electric fields are nearly opposite to each other between the adjacent electrode pairs.

Claims 27-28 are allowed by virtue of their dependency on claim 26.

Regarding **claim 29**, the applied references fail to disclose or render obvious the claimed limitations, specifically wherein the switching apparatus using a piezoelectric

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element, comprising: a piezoelectric element; a first movable portion including the piezoelectric element; a pair of second movable portions which couple to the first movable portion and include the piezoelectric element; plural electrode pairs for applying electric fields to said first movable portion and said second movable portion; and an electric field applying unit which applies electric fields so that the directions of the electric fields are nearly opposite to each other between the adjacent electrode pairs of said plural electrode pairs.

Claim 30 is allowed by virtue of its dependency on claim 29.

Regarding **claim 31**, the applied references fail to disclose or render obvious the claimed limitations, specifically wherein the switching system using a piezoelectric element, comprising: a piezoelectric element; a first movable portion including the piezoelectric element; a second movable portion provided around said first movable portion and including the piezoelectric element; plural electrode pairs for applying electric fields to said first movable portion and said second movable portion; an electric wiring for supplying electric power to these electrode pairs; an electrode pair for electrically connecting an antenna and a high-frequency circuit for transmission and reception; and a coupler for matching said piezoelectric element to said high-frequency circuit, wherein the electric fields in the plural electrode pairs are applied to said piezoelectric element so that the directions of the electric fields are nearly opposite to each other between the adjacent electrode pairs.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sonny TRINH whose telephone number is 571-272-7927. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward URBAN can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

2/10/06


SONNY TRINH
PRIMARY EXAMINER